

Remarks/Arguments

Reconsideration and allowance are respectfully requested in light of the following remarks.

Claims 1, 3, 5-12 and 20-29 and 32-35 remain pending. Claims 2, 4, 13-19 and 30-31 have been cancelled. Claims 1, 3, 5-12 and 20-26 have been withdrawn from consideration. Claims 20-23, 26 and 27 have been amended in this Amendment.

Withdrawn claims 20-23 and 26 have been amended simply to make them dependent, in one way or another, on claims 27-29 and 32-35, currently under examination. In this way, these previously withdrawn claims are appropriate for rejoinder on the allowance of the elected claims (see MPEP §§821.04(a) and (b)).

Claims 27-29 and 32-35 are directed to an aqueous binder composition for making glass fiber products. Claim 27 is independent and the remaining claims are dependent.

Claim 27 has been amended to introduce the recitation that the claimed “water soluble adduct” is produced by a solution polymerization that is accomplished in an aqueous environment, *i.e.*, “an aqueous free radical solution polymerization.” Support for the claim amendment is found, *inter alia*, in paragraph [42], and in Examples 1, 1A, 1B, 2, 6, 6A, 8, 8A, 10 and 12.

No new matter has been introduced by any of the amendments.

Claims 27-29, 32 and 34 stand rejected as being anticipated, within the meaning of 35 U.S.C. 102(b), by Pourahmady et al (U.S. 5,498,658) – the Pourahmady ‘658 patent. This rejection is respectfully traversed.

In framing this rejection, the Office Action has overlooked a fundamental difference between the subject matter described by the cited Pourahmady ‘658 patent and the subject matter defined by the pending claims. In particular, the Pourahmady ‘658 patent is directed to a formaldehyde-free **latex**, *i.e.*, the polymer of the Pourahmady ‘658 patent is an emulsion or a suspension of water-insoluble polymer particles and thus the polymer is **NOT** water soluble. In contradistinction, the pending claims require that the polymer be a “water soluble adduct.” Pointedly, as described in the examples, the latex of the Pourahmady ‘658 patent is prepared by

an **emulsion polymerization**¹; while in accordance with the pending claims, the claimed water soluble adduct is prepared by “an aqueous free radical solution polymerization.”

This fundamental difference in the nature of these two materials results from the differences in the monomers and their relative proportions in making the respective polymers. The Pourahmady ‘658 patent requires the use of (meth)acrylonitrile as an essential component (subpart (c) of the monomer components – in an amount of 1-60 phr), does not require that the functional monomer bear a hydroxyl group (a hydroxyl is only one of several optional nucleophilic groups Y for the functional monomer, see lines 2-4 of col. 3) and permits up to 80 phr of what are hydrophobic monomers (subparts (d) and (e)). In contrast, the present invention requires monomers bearing both carboxyl and hydroxyl groups in a particular mol ratio and in an amount to yield a “water soluble adduct.” As discussed in paragraphs [48] and [49], hydrophobic monomers generally should constitute at most about 20% by weight, or up to 40% by weight when using charged monomers, but nowhere near the up to 80% contemplated by the Pourahmady ‘658 patent.

These monomer distinctions are particularly evident in a comparison of the specific examples. In the Pourahmady ‘658 patent examples (summarized in Table IV and V of the Pourahmady ‘658 patent), both the functional monomer and the dicarboxylic acid component generally each constituted less than about 10% of the monomer mixture, with the acrylonitrile and hydrophobic monomer generally, jointly comprising about 80% and higher. The highest content of a hydroxyl monomer was only 8% (Example 2).² In contrast, in the illustrative Examples of the present invention, as summarized in the Table below,

Example No.	Carboxyl Monomer	Hydroxyl Monomer	Hydrophobic Monomer	Charged Monomer
1	46.3 MA	53.7 HEA	None	
1A	46.3 MA	53.7 HEA	None	
1B	46.3 MA	53.7 HEA	None	

¹ The brief reference to solution polymerization “utilizing polar and non-polar solvents” (col 3, lines 52-56) in the Pourahmady ‘658 patent does not constitute a clear and direct teaching to make water-soluble polymers, particular in view of the pervasive references to latex and emulsion polymerization.

² Example 22 in Table IV appears to have “50 HEA.” However, as is clear from the distribution of the remaining monomers and Example No. 22 in Table V, this was actually supposed to be 5.0 HEA.

Example No.	Carboxyl Monomer	Hydroxyl Monomer	Hydrophobic Monomer	Charged Monomer
2	38.6 IA	61.4 HEA	None	
6	43.4 MA	42.1 HEA	14.5 VA	
6A	45.1 MA	31.9 HEA	23 VA	
8	28.5 MA	37.9 HEA	28.5 Sty	5.1 SPSS
8A	28.6 MA	38.1 HEA	28.6 Sty	
10	45.8 MA	9.6 HEA	36.6 Sty	7.9 SPSS
12	37.1 MA	29.8 HEA	28.7 Sty	4.4 SPSS

where the approximate amounts (phr) of the various monomers are detailed, the sum of the carboxyl and hydroxyl monomers was always in excess of 50 phr, and typically in excess of 60 phr. The differences between the the Pourahmady '658 patent and the claimed invention are striking.

For a reference to serve as an anticipation of a claimed invention, the reference must teach each and every limitation of the claimed invention. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 58 USPQ2d 1286, 1291 (Fed. Cir. 2001). Since the Pourahmady '658 patent does not disclose (or even suggest) the preparation and use of a water soluble adduct resulting from the free radical solution polymerization of an unsaturated carboxylic acid monomer and an unsaturated hydroxyl monomer in an aqueous environment, the anticipation rejection fails.

Claim 35 stands rejected as being unpatentable, within the meaning or 35 U.S.C. 103(a), over Pourahmady et al (U.S. 5,498,658) – the Pourahmady '658 patent. This rejection is respectfully traversed.

Claim 35 is a dependent claim. Since nothing in the Pourahmady '658 patent suggests the preparation and use of a water soluble polymer, as detailed above, the Pourahmady '658 patent cannot make obvious the subject matter of dependent claim 35.

Claims 27-29 and 32-35 stand rejected as being unpatentable within the meaning or 35 U.S.C. 103(a) over Reck et al., U.S. Patent 6,114,464 (Renk '464). This rejection is respectfully traversed.

Renk '464 describes a thermally curable mixture of hydroxyalkylated polyamines and polycarboxylic acids useful as binders for shaped articles, such as chipboard. Renk's binder

composition requires two distinct components (1) a water-soluble, linear or branched aliphatic compound containing at least two functional amino groups and having at least one hydroxyalkyl moiety (*i.e.*, a complex alkanolamine) and (2) an addition polymer containing from 5 to 100% by weight of units derived from at least one ethylenically unsaturated mono- or dicarboxylic acid and obtainable by free-radical polymerization. The addition polymer, **component (2)** contains from 5 to 100% by weight, of units derived from at least one ethylenically unsaturated mono- or dicarboxylic acid. Other vinyl compounds that can be polymerized with the unsaturated mono- or dicarboxylic acid(s) are described in columns 15-16 of the Renk '464 patent.

As the Office Action notes some of the unsaturated monomers suggested by Renk for co-reaction with the at least one ethylenically unsaturated mono- or dicarboxylic acid in preparing **component (2)** are compounds having a hydroxyl moiety, such as hydroxyethyl (meth)acrylate. Renk, however, does not specifically describe using such monomers to make **component (2)** and does not indicate at what level such compounds should be used. Indeed, we submit that based on the entirety of Renk's teachings a skilled worker would not have found it obvious to use such monomers in the amount required by the pending claims for preparing the "water soluble adduct resulting from free radical solution polymerization of an unsaturated carboxylic acid monomer having a molecular weight of less than 750 and an unsaturated hydroxyl monomer having a molecular weight of less than 750."

As presently defined, the pending claims require that a sufficient amount of the unsaturated hydroxyl monomer be supplied so that the COOH:OH ratio of the resulting adduct be in the range of 1.5:1 to 0.7:1. We submit that nothing in Renk would have led a skilled worker to this particular result.

Indeed, we submit that when a skilled worker considers the actual examples presented by Renk for illustrating the invention and also considers other specific teachings in the application, the skilled worker would conclude that Renk '464 favors the use of **component (1)**, *i.e.*, the linear or branched aliphatic compound containing at least two functional amino groups (*i.e.*, the complex alkanolamine), generally as the sole source and clearly as the primary source of hydroxyl groups for reacting with the addition polymer, **component (2)**.

Renk teaches (in the paragraph bridging columns 18 and 19) that the complex alkanolamine (**component (1)**) and the addition polymer (**component (2)**) are preferably used

in such a relative ratio that the molar ratio of carboxyl groups of component (2) to hydroxyl groups of component (1) is within the range from 20:1 to 1:5, preferably within the range from 8:1 to 1:2, particular preferably within the range from 4:1 to 1:1.

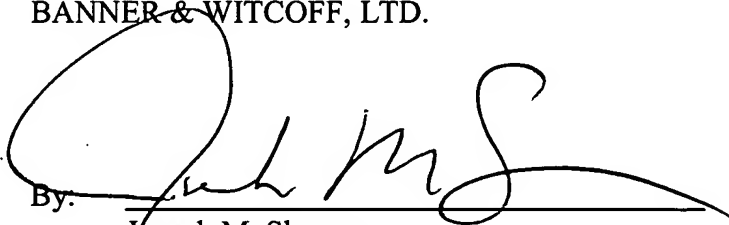
Including a substantial amount of hydroxyl groups as part of the molecular make-up of **component (2)** would significantly alter the COOH to OH ratio in a way Renk does not consider or discuss. Indeed, it is apparent in the progression of Renk's preferred, to more preferred, to most preferred COOH:OH ratio ranges that Renk favors the presence of excess carboxyl (COOH) groups, a preference that would be upset by the presence of a significant fraction of hydroxyl (OH) groups as part of the addition polymer itself.

Thus, when one considers that all of the Examples in the Renk '464 patent appear to use solely unsaturated carboxyl monomers for making the addition polymer, **component (2)**, and that the use of an unsaturated hydroxyl monomer for making the addition polymer is not remotely mentioned in the examples, a skilled worker would not have found it obvious to produce a binder composition containing the a water soluble adduct required by the pending claims.

Applicants request reconsideration of the pending claims in view of the foregoing amendments and arguments.

Respectfully submitted,

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